# STATE OF CALIFORNIA AIR RESOURCES BOARD

# AIR MONITORING QUALITY ASSURANCE

#### **VOLUME V**

### STANDARD OPERATING PROCEDURES FOR AIR QUALITY MONITORING

#### APPENDIX T

# PERFORMANCE AUDIT PROCEDURES FOR TOTAL SUSPENDED PARTICULATE TOXIC METAL LABORATORY AUDITS

MONITORING AND LABORATORY DIVISION
SEPTEMBER 2002

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# STATE OF CALIFORNIA AIR RESOURCES BOARD

# AIR MONITORING QUALITY ASSURANCE

#### **VOLUME V**

### STANDARD OPERATING PROCEDURES FOR AIR QUALITY MONITORING

#### APPENDIX T.1.0

PERFORMANCE AUDIT PROCEDURES
FOR
TOTAL SUSPENDED PARTICULATE TOXIC METAL LABORATORY AUDITS

MONITORING AND LABORATORY DIVISION
SEPTEMBER 2002

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#### T.1.0 INTRODUCTION

#### T.1.0.1 <u>GENERAL INFORMATION</u>

Audits for toxic metals are conducted at the Inorganics Laboratory Section of the Air Resources Board's (ARB) Monitoring and Laboratory Division (MLD). On an annual basis, ARB purchases standard samples from Inorganic Ventures, Inc. A sample filter set, with accompanying data forms, is sent to the ARB's Quality Assurance Section (QAS) which forwards it to the MLD's Inorganics Laboratory Section for analysis. The laboratory uses graphite furnace atomic absorption spectrometry and follows Standard Operating Procedure (SOP) Number MLD 005, REV. 5.2 for processing and analysis. The sample is analyzed to determine the amount of lead (Pb) in suspended particulate matter. The results are returned to the QAS for calculation of the percent difference.

The purpose of the audit is to assess the accuracy of the laboratory's operating practices and procedure.

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### T.1.1 AUDIT PROCEDURES

#### T.1.1.1 <u>INITIATION OF AUDIT</u>

Upon receiving the Inorganic Ventures audit sample filters (see Figure T.1.1.1), the QAS will document receipt of the filters and accompanying data forms. The audit filters will be forwarded to the Inorganics Laboratory Section for analysis.

#### T.1.1.2 STANDARD OPERATING PROCEDURES

All filters supplied by Inorganic Ventures and audited by the Inorganics Laboratory Section are processed using SOP Number MLD 005, REV. 5.2.

#### T.1.1.3 COMPLETION OF AUDIT

Upon completion of audit filter processing and analysis, the Inorganics Laboratory Section sends a memo containing raw data and any additional comments or information to the QAS.

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# Certificate of Analysis



#### **CUSTOM-GRADE FILTER STANDARDS CARB-DISKS**

Filter 1A, 1B and 1C Blank

Filter 2A, 2B and 2C 0.24  $\mu$ g/filter As, 0.12  $\mu$ g/filter Cd, 2.04  $\mu$ g/filter Pb Filter 3A, 3B and 3C 0.76  $\mu$ g/filter As, 0.24  $\mu$ g/filter Cd, 7.80  $\mu$ g/filter Pb

AsCdPbStarting Material:Arsenic MetalCadmium MetalLead NitrateStarting Material Purity:99 + %99 + %99 + %Starting Material Lot No:G21F16K17D0722150

#### TRACEABILITY DOCUMENTATION FOR FILTER STANDARD - N-MEB74133

Certified Value:	As	Cd	Pb
Filter 1A	00 1	0	Ó
Filter 1B	0 1	0	0
Filter 1C	0	0	0
Filter 2A	0.241 μg	0.121 μg	2.05 μg
Filter 2B	0.241 μg	0.120 μg	$2.05 \mu g$
Filter 2C	0.241 μg	0.121 μg	2.05 μg
Filter 3A	0.763 μg	0.241 μg	7.83 μg
Filter 3B	0.762 μg	0.241 μg	$7.82 \mu g$
Filter 3C	$0.762~\mu\mathrm{g}$	0.241 μg	$7.82 \mu g$
			, 0

The above certified values are based on the starting materials. As is traceable to NIST SRM 3103a. Cd is traceable to NIST SRM 3108. Pb is traceable to NIST SRM 3128.

We use purified acids, 18 megohm double deionized water & meticulously cleaned bottles in the manufacturing of Custom-Grade standards. We always use "in-house calibration checked" Class A Glassware. Our standards are made gravimetrically using balances that are calibrated with registered NJ Weight Sets #NJ89074, NJ89034, NJ90292 and NJ91091. These weights are registered with the NJ Office of Weights and Measures and are traceable through the standards of the State of NJ to NIST (formerly NBS).

Rev.08179



Paul R. Laines

Quality Assurance Manager

Expires:

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#### T.1.2 POST AUDIT CALCULATIONS

#### T.1.2.1 CALCULATION OF PERCENT DIFFERENCE

The QAS shall calculate the percent difference between the Inorganics Laboratory Section's measured results and Inorganic Ventures' assigned results using the following equation (results are recorded in micrograms (ug) / filter):

Percent = (<u>Measured Concentration - Assigned Concentration</u>) x 100 Difference Assigned Concentration

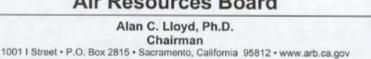
#### T.1.2.2 FINAL AUDIT REPORT

The QAS will forward the Final Results Report Memo (see Figure T.1.2.1) with a cover letter to the Inorganics Laboratory Section. In the event that the percent difference exceeds  $\pm 20\%$ , the laboratory will be asked to investigate the cause of the difference. In addition, the QAS will include recommendations for reducing the exceedance.

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# Air Resources Board





#### **MEMORANDUM**

TO:

Mike Poore, Chief

Northern Laboratory Branch

THROUGH: Jeff Cook, Chief

Quality Management Branch

FROM:

Michael Miguel, Manager Quality Assurance Section

DATE:

August 6, 2001

SUBJECT: SECOND QUARTER 2001 TOXIC METALS LABORATORY AUDIT

RESULTS

The Quality Assurance Section (QAS) conducted a laboratory performance audit of the Hi-Vol Total Suspended Particulate (TSP) metals analysis program. The audit materials provided to the Inorganics Laboratory Section (ILS) contained lead (Pb). ILS utilized graphite furnace atomic absorption spectrometry to determine the concentrations of lead present in the audit materials. The results of the audit are as follows (values are in µg/filter):

Sample Number	Compound	Reported Values	Actual Values	Percent Difference
1C	Pb	<lod< td=""><td>0</td><td>***</td></lod<>	0	***
2C	Pb	2.06	2.05	0.49
3C	Pb	7.74	7.82	-1.02

The percent difference was calculated as follows:

Percent Difference = Reported Value - Actual Value X 100 Actual Value

The laboratory's responses were within the targeted ±20 percent limit. Thank you for your participation in this program. In addition to the U.S. EPA's NPAP lead audit, the QAS would like to continue this audit program on a biannual basis. If you have any questions, please call Tim Gergen of my staff at (916) 322-7053.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

California Environmental Protection Agency

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